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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,967

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EXAMINER

YOUNG, NATASHA E

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/581,967

Applicant(s)

MUKAI ET AL.

Examiner

Natasha Young

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1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 06/07/2006.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Komiya et al (US 2002/0042035 A1).

Regarding claim 1, Komiya et al teaches a hydrogen generator comprising: a mixed gas passage configured to flow a mixed gas containing two or more components; first and second passages configured to branch off, at their leading ends, from the mixed gas passage and join to each other at their trailing ends; first turning means formed in the first passage to turn the mixed gas flowing in the first passage in a first direction; second turning means formed in the second passage to turn the mixed gas flowing in the second passage in a second direction opposite to the first direction; and a hydrogen generating section configured to generate hydrogen by causing a chemical reaction of the mixed gas which flows out from the joined trailing ends of the first and second passages (see Abstract, figure 1, and paragraphs 0012-0013 and 0077).

Claim 2 depends on claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claim.

Regarding claim 2, Komiya et al teaches the first and second passages are formed so as to allow the mixed gas to turn in the first and second directions

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respectively, when flowing in planes perpendicular to the outflow direction of the mixed gas flowing out from the trailing ends of the first and second passages (see figure 1).

Claim 3 depends on claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 3, Komiya et al teaches the first and second passages have a common central axis and are hollow in shape, each having an open outer periphery and a circular opening at the center thereof, said outer periphery of each passage constituting an inlet that serves as the leading end while said opening of each passage constitutes an outlet that serves as the trailing end; wherein the first turning means is composed of a plurality of partition walls that partition the inner space of the first passage in a direction along the central axis and each partition wall extends inwardly from the outer periphery of the inner space such that its trailing end is deviated from its leading end in said first direction with respect to a radial direction; and wherein the second turning means is composed of a plurality of partition walls that partition the inner space of the second passage in a direction along the central axis and each partition wall extends inwardly from the outer periphery of the inner space such that its trailing end is deviated from its leading end in said second direction with respect to a radial direction (see figure 1).

Claim 4 depends on claim 3 such that the reasoning used to reject claim 3 will be used to reject the dependent portions of the claim.

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Regarding claim 4, Komiya et al teaches the angle of deviation of the trailing end from the leading end around the central axis in each partition wall is within the range of 45 to 90 degrees (see figure 1).

Claim 5 depends on claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 5, Komiya et al teaches a plurality of said first and second passages and a plurality of said first and second turning means are arranged along the central axis (see figures 1-2).

Claim 6 depends on claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claim.

Regarding claim 6, Komiya et al teaches the first and second passages are formed so as to allow the mixed gas to turn in the first and second directions respectively, when flowing in cylindrical planes parallel to the outflow direction of the mixed gas flowing out from the trailing ends of the first and second passages (see figure 1).

Claim 7 depends on claim 6 such that the reasoning used to reject claim 6 will be used to reject the dependent portions of the claim.

Regarding claim 7, Komiya et al teaches the first and second passages have a common central axis and are respectively formed in the shape of a tube of annular section, and one end face of each passage constituting an inlet that serves as the leading end while the other end face of each passage constitutes an outlet that serves as the trailing end; wherein the first turning means is composed of a plurality of partition

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walls that turn in the first direction, helically partitioning the tubular inner space of the first passage; and wherein the second turning means is composed of a plurality of partition walls that turn in the second direction, helically partitioning the tubular inner space of the second passage, Komiya et al teaches (see Abstract and figure 1).

Claim 8 depends on claim 7 such that the reasoning used to reject claim 7 will be used to reject the dependent portions of the claim.

Regarding claim 8, Komiya et al teaches the turning angle of each of the partition walls from its leading end to its trailing end is within the range of 45 to 90 degrees (see figure 1).

Claim 9 depends on claim 8 such that the reasoning used to reject claim 8 will be used to reject the dependent portions of the claim.

Regarding claim 9, Komiya et al teaches the outlets of turning passages separated by the partition walls are partially closed (see figure 1).

Claim 10 depends on claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claim.

Regarding claim 10, Komiya et al teaches the first passage and the second passage are separated from each other by a cylindrical dividing wall, the outlets of the turning passages of either the first or second passage are closed, and an opening is formed in the dividing wall at a position in the vicinity of each of the closed outlets (see figure 1).

Claim 11 depends on claim 6 such that the reasoning used to reject claim 6 will be used to reject the dependent portions of the claim.

Regarding claim 11, Komiya et al teaches a plurality of said first passages are arranged along the central axis such that the trailing end of a first passage located in an upstream position when viewed in the flowing direction of the mixed gas is connected to the leading end of a first passage located in a downstream position and a plurality of said second passages are arranged along the central axis such that the trailing end of a second passage located in an upstream position when viewed in the flowing direction of the mixed gas is connected to the leading end of a second passage located in a downstream position (see Abstract, figure 1, and paragraphs 0012-0013).

Claims 12-13 depend on claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claims.

Regarding claim 12, Komiya et al teaches the mixed gas is a mixture of water and an organic compound containing at least carbon and hydrogen; the chemical reaction is a steam reforming reaction in which hydrogen is generated from the mixed gas of the organic compound and water; the hydrogen generating section is a reforming reactor section for generating a hydrogen-rich reformed gas through the steam reforming reaction; wherein the first turning means and second turning means are located at positions upstream of the reforming reactor section; and wherein the mixed gas flowing out from the joined trailing ends of the first and second passages is supplied to the reforming reactor section to generate hydrogen (see Abstract, figure 1, and paragraph 0002).

Regarding claim 13, Komiya et al teaches the mixed gas is a mixture of the reformed gas and oxygen, and a selective oxidation reactor section is used in place of

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the hydrogen generating section, the selective oxidation reactor section reducing carbon monoxide contained in the reformed gas through a selective oxidation reaction in which carbon monoxide is converted into carbon dioxide; wherein the first turning means and second turning means are located at positions upstream of the selective oxidation reactor section; and wherein the mixed gas flowing out from the joined trailing ends of the first and second passages is supplied to the selective oxidation reactor section to reduce carbon monoxide contained in the reformed gas (see paragraphs 0088-0096 and figure 1).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miura et al (US 6,481,207 B2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natasha Young whose telephone number is 571-270-3163. The examiner can normally be reached on Mon-Thurs 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NY

  
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SUPERVISORY PATENT EXAMINER